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Are you thirsty? Changing the liquid fasting paradigm – The "Sip Til Send" initiative

Fernando Arduini MD (Hons) TEA/SBA GChPOM FANZCA

Staff Specialist Anaesthetist, Perioperative Medicine Clinical Lead, ERAS and Sip Til Send Hospital Lead, Department of Anaesthesia, Pain and Perioperative Medicine, Grampians Health Ballarat, Ballarat, Australia

Dr Fernando Arduini is a staff specialist anaesthetist at Grampians Health in Ballarat. He is also the ERAS and Sip Til Send implementation lead for Grampians Health Ballarat and a member of the ANZCA Perioperative Medicine SIG and the Australasian Sip Til Send Network. His interests include quality initiative projects in perioperative medicine, cardiopulmonary exercise testing, prehabilitation, and enhanced recovery pathways.

Phuong Markman MBBS BMedSci (Hons) FANZCA

Staff Specialist Anaesthetist, Founder and Administrator of the Australasian Sip Til Send Network. Head of Anaesthesia Research, Department of Anaesthesia and Pain Medicine, Cairns Hospital, Cairns, Australia

Dr Phuong Markman founded the Australasian Sip Til Send Network in 2023 to promote a collaborative scientific approach to this paradigm shift in preoperative fasting practice. He is the lead investigator for the Australasian Multicentre Aspiration Risk Study, which involves around 30 hospitals. He co-ordinates his department's research and quality improvement activities and was co-convenor for workshops at the ANZCA Annual Scientific Meeting 2025.

Hannah Shoemaker MBBS BMedSci PGDipEd FANZCA

Consultant Anaesthetist, Department of Anaesthesia, Pain and Perioperative Medicine, Grampians Health Ballarat, Ballarat, Australia

Dr Hannah Shoemaker is a specialist anaesthetist in mixed public and private practice with a fellowship in paediatric anaesthesia. She is an ANZCA supervisor of training and has interests in human factors, system design, and the training of clinical decision-making to improve quality in both patient and team experience.

Cathy King MD, BHlthSc (Hons) BPharm

Anaesthetics Registrar, Department of Anaesthesia, Pain and Perioperative Medicine, Grampians Health Ballarat, Deakin University Affiliate Lecturer, Ballarat, Australia

Dr Cathy King is a critical care resident in the Department of Anaesthesia and Perioperative Medicine at Grampians Health Ballarat. She is inspired by her time as a pharmacist working on drug discovery and has a keen interest in medical education, perioperative medicine, and research.

Edited by Professor Alicia Dennis

INTRODUCTION

Preoperative fasting is a critical component of patient preparation for surgery, traditionally aimed at reducing the risk of pulmonary aspiration during anaesthesia. However, prolonged fasting can lead to patient discomfort, dehydration, and other complications. The "Sip Til Send" approach, an emerging practice in perioperative care, offers a promising alternative by allowing patients to sip approved clear liquids until called to theatre.

The "Sip Til Send" approach permits patients to consume small amounts of clear liquids, such as water, black tea or coffee, and electrolyte solutions, thereby reducing the duration of liquid fasting without an apparent increase in the risk of aspiration. This method has shown potential benefits, including decreased postoperative nausea and vomiting, improved hydration, and enhanced patient satisfaction.

This article aims to increase awareness among anaesthetists about the "Sip Til Send" approach, highlighting its benefits, implementation strategies, and the evidence supporting its safety and efficacy. Adopting this practice enhances patient experience and thereby improves perioperative care.

HISTORY OF PREOPERATIVE LIQUID FASTING – AN ANAESTHETIC DOGMA

Mid-late 19th century – The beginning

In the mid to late 19th century, anaesthesia transitioned from William Morton's ether to James Simpson's chloroform. Preoperative fasting was recommended to reduce nausea and vomiting, with operations ideally held before breakfast or the next meal.[1,2] In 1883, British surgeon Sir Joseph Lister introduced the first fasting guideline, distinguishing between solids and liquids. He suggested avoiding solid food but allowed certain liquids two hours before surgery, noting that prolonged fasting worsened exhaustion. This highlighted the negative impact of extended preoperative fasting for the first time.[1,2]

Mid-late 20th century – "Nil by mouth" (NBM) concept, gastric contents and aspiration risk

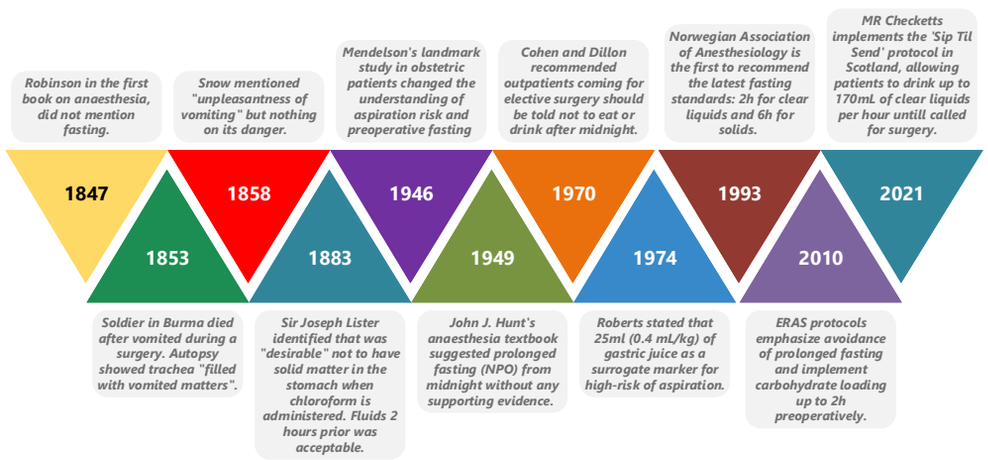
Preoperative fasting became widely accepted in the mid-20th century to reduce the risk of pulmonary aspiration without distinguishing between clear liquids and solids.[2-6] In 1946, American obstetrician and cardiologist Curtis Lester Mendelson described chemical pneumonitis caused by aspiration of gastric contents based on a retrospective study of 66 cases of aspiration during anaesthesia of 44,016 pregnant women from 1932 to 1945. Two patients died from airway obstruction by solids and 40 who aspirated liquids had short-lived asthma-like symptoms.[2-6] This condition is now known as Mendelson's syndrome, an eponym for aspiration pneumonitis.

Fearing the occurrence of Mendelson's syndrome in patients undergoing elective surgery, Cohen and Dillon developed the concept of "nil by mouth from midnight". They recommended that all patients fast after midnight regardless of their preoperative risk factors.[1-4]

MR Checketts, in his editorial in *Anaesthesia*, remarked that fasting for an "empty stomach" might be a prime example of medical sophistry. This conclusion seems logical but lacks supporting evidence and is essentially a fallacy.[3] Although it appears reasonable to believe that fluid fasting would ensure an empty stomach prior to the induction of anaesthesia, thereby reducing the risk and severity of aspiration, gastric ultrasound studies have indicated that fasting does not achieve an "empty stomach" in approximately 10% of patients.[7]

In 1974, Roberts found that around 25 mL (0.4 mL/kg) of gastric juice indicated a high risk of aspiration in monkeys.[1,4] Recent studies set the threshold for an empty stomach at 1.5 mL/kg, the 95th-97th percentile of gastric volume in fasting adults.[7] The body secretes about 2.5 L of gastric juice and saliva daily, increasing up to 600 mL/hr during the cephalic phase of digestion. Therefore, fasting may not ensure an entirely empty stomach.[2] The timeline of the development of concepts and fasting rules is shown in Figure 1.

Figure 1. The fasting timeline



Information sourced from Maltby (2006),[1] Ruggeberg et al. (2024),[2] Checketts (2023)[3] and Gan et al. (2024)[4]

The dogma in anaesthetic practice persists – Why do we need to challenge it?

Brady et al., in a 2003 Cochrane review, not only showed that there was no evidence to suggest that a shortened liquid fast was associated with increased aspiration risk, regurgitation, or related morbidity compared to a "fast from midnight" but also showed that allowing patients to drink water preoperatively resulted in significantly lower gastric volumes.[8] The recommendations arising from this study became central to subsequent fasting guidelines worldwide.

The current guidelines recommend a two-hour fast from clear liquids and a 6-hour fast from solids for adults.[3, 9-11] However, adults' typical fasting time from clear liquids is nine-12 hours.[11] There are many reasons why patients are inappropriately fasted, from the ease of writing "NPO" (nil per os) or "FFMN" (fast from midnight) to staff and patient anxiety regarding fear of aspiration, cancellations, inability to easily reschedule and the belief that it is safer.[2,3,10] Prolonged fasting is still a significant issue in many hospitals worldwide and does not come without harm.

Despite a paucity of evidence and theoretical pathophysiological basis for harm with clear liquid fasting shorter than two hours, previous institutional efforts to reduce fasting time have demonstrated limited or non-lasting efficacy.[12]

With a desire to reduce liquid fasting duration and increasing confidence that clear liquids empty rapidly from the stomach, more anaesthetists are adopting approaches like "Sip Til Send", "Drink Until Called", "Liberal clear liquids fasting" or "Unrestricted drinking before surgery".[2]

The latest update of the *PG07* 2024

Regarding our guidelines in Australia and New Zealand, the Australian and New Zealand College of Anaesthetists (ANZCA) recently updated the professional document *PG07 Guideline on pre-anaesthesia consultation and patient preparation 2024*.[13] The Appendix 1 refers to matters related to fasting guidelines. The recommendations for solid food were unchanged, but the approach for clear liquids has been updated to reflect the latest published evidence. The document's salient points are:

- Recognition of "Sip Til Send" as *"an emerging practice gaining increasing acceptance and has been shown to reduce fasting duration."*
- *"To date, strategies involving liberal clear liquids have not shown significant evidence for increased aspiration risk..."*
- Multifactorial risk factors contribute to delayed gastric emptying.
- Gastric ultrasound could be used as a tool to guide further management for the risk of aspiration.[13]

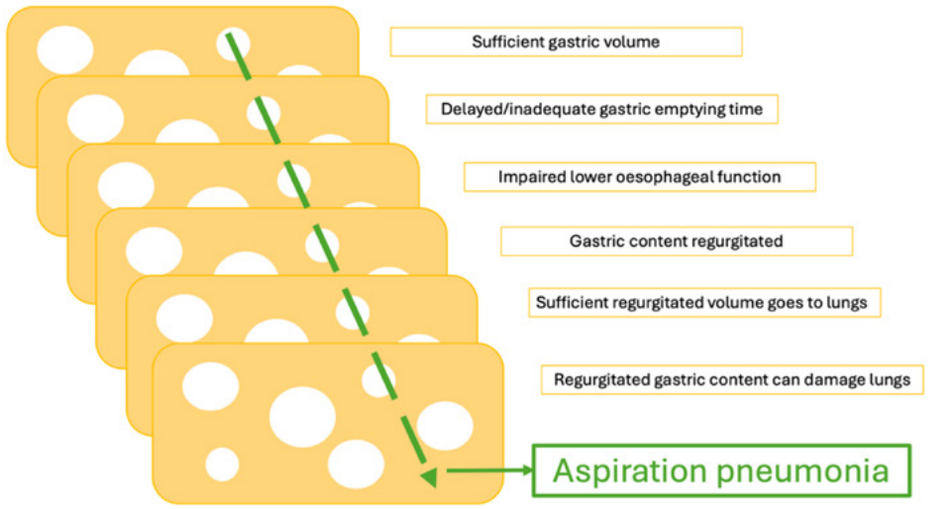
THE CHALLENGES IN DETERMINING ASPIRATION RISK

Perioperative aspiration – A rare event

The risk of aspiration following an elective procedure ranges from one in 900 to one in 10,000, whereas for an emergency tracheal intubation, it occurs in approximately one in 12 people.[7,10,14-16] Serious complications associated with aspiration are predominantly due to solids, while clear fluid aspiration rarely results in significant consequences.[2,4] There is currently no evidence indicating a correlation between drinking clear liquids and the risk of aspiration in elective surgery patients.[2] In severely ill adults, mortality from aspiration is typically caused by acute asphyxia resulting from complete airway obstruction by solids or particulate matter.[16]

A Swiss cheese model for aspiration pneumonia (Figure 2) illustrates how several factors need to align for aspiration pneumonia to occur in an elective setting, even with adherence to fasting recommendations. There must be enough gastric content present, which implies delayed gastric emptying and the lower oesophageal sphincter must be impaired, such as in patients with reflux disease or an inability to hold the gastric pressure caused by tracheal intubation reflexes secondary to inadequate anaesthesia.[2,17] The residual gastric content must then be regurgitated and reach the bronchi to cause pulmonary injury.[2] After the initial chemical pneumonitis resulting from the acidic nature of gastric contents, only a subset of these patients will develop pneumonia.

Figure 2. Aspiration pneumonia sequence of events

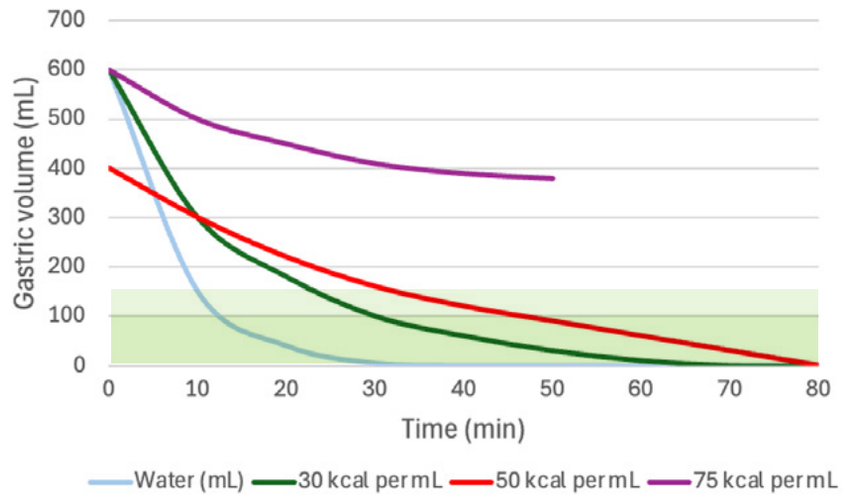


Adapted from Ruggeberg (2024)[2]

Variability of gastric emptying

Clear liquids (water/low calorie) have a half-life of 10-15 minutes, with the stomach emptying 500 mL of water in 20-30 minutes, though there is 30% inter-subject variability (Figure 3).[2,3,18,19] Gastric emptying of clear liquids follows first-order kinetics, in which an increase in fluid volumes in the stomach results in an increased rate of gastric emptying.[2,14] It is also proportional to the rate of filling; therefore, drinking clear liquids also speeds up the emptying of the stomach.[2,14] Whereas, gastric emptying times are slower with higher energy clear liquids as the receptors in the small intestines regulate gastric emptying to approximately 200 kcal/hr to prevent the intestine from receiving more nutrients than it can absorb.[2] With non-clear liquids, gastric emptying time depends on the calorie and nutrient content, whereby carbohydrates empty faster than proteins and fat.[2,19] It is also interesting to note that drinking tea or coffee with a dash of milk (up to 20% of the total volume or 50 mL) is comparable to drinking black coffee or tea.[2,20]

Figure 3. Gastric emptying after drinking water and clear carbohydrate liquids with three different calorie contents



The range of normal gastric residual volumes is indicated in green.

Glucagon-like peptide-1 receptor agonists (GLP-1 RA) and delayed gastric emptying

Emerging weight-loss strategies using novel drugs such as long-acting glucagon-like peptide-1 receptor agonists (GLP-1 RA) (e.g. semaglutide (Ozempic®)) are increasingly being used in the community. Those drugs are known to significantly delay gastric emptying for solids. Silveira et al. performed a retrospective analysis of patients undergoing elective upper endoscopy and the relationship between perioperative semaglutide and gastric content.[21] The study showed that perioperative semaglutide use was associated with an increased residual gastric volume in 24.2% of patients taking the drug compared with those who were not ($p<0.001$).[21] Solid content was present in 85.2% of the patients taking the drug.[21] Only four patients met the study criteria for an increased gastric fluid volume of >0.8 mL/kg, but this volume is considered by some to be below the threshold for increasing aspiration risk (baseline gastric secretions of >1.5 mL/kg).[21,22]

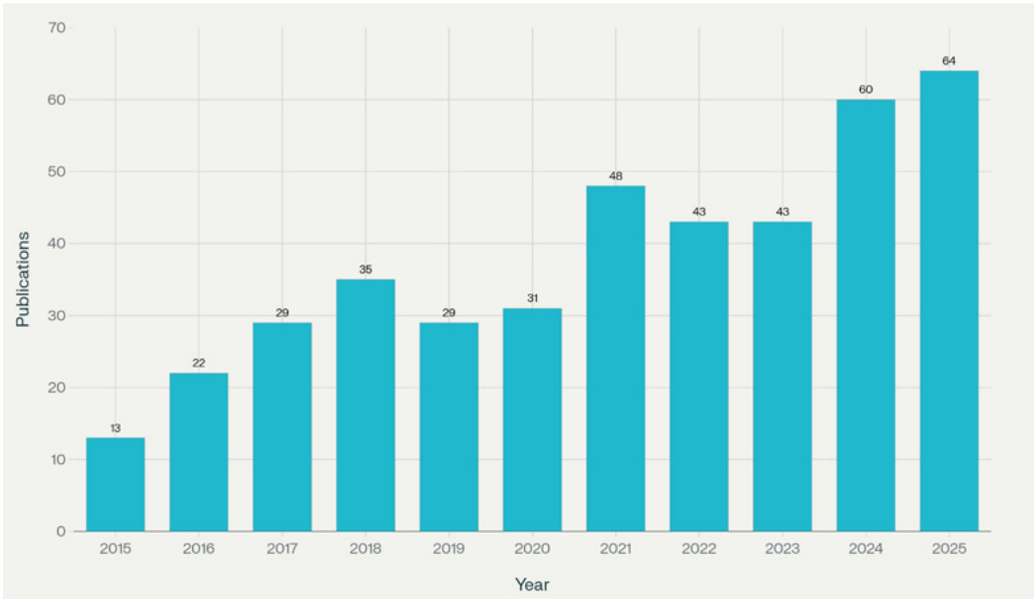
In 2024, Facciorusso published a large meta-analysis on the effects of GLP-1 RA on upper gastrointestinal endoscopy. The study also showed increased residual gastric contents and more frequent aborted procedures in patients using those medications.[23]

Several studies on perioperative management of GLP-1 RAs are currently being conducted worldwide. As of the time of writing of this article, there is still much controversy around the topic of withholding (and how long before surgery) or not. Numerous colleges and medical societies across the globe have released joint statements to address the issue, but at this stage, there is not enough evidence to reach a consensus.

Emergence of gastric ultrasound as a risk assessment tool

Given the widespread use of GLP-1 RA drugs and the move to a more liberal liquid fasting practice, there is an increased demand for an objective method to assess stomach content. According to PubMed data (Figure 4), interest in preoperative gastric ultrasound as a risk assessment tool has increased exponentially among anaesthetists and perioperative physicians, reflected by the number of publications in the last decade.

Figure 4. Number of perioperative gastric ultrasound publications in the last decade
Source: PubMed



Even though gastric ultrasound is known to be highly sensitive and specific, it is still operator dependent. What is quite reassuring is that according to a recent study from 2022, Tankul et al. demonstrated that many anaesthetists might have an advantage compared to others when learning gastric ultrasound.[24] Anaesthetists with experience in regional blocks required only nine scans after a teaching intervention in a

workshop to achieve 98.7% sensitivity and 93.8% specificity.[24] The learning process for anaesthetic trainees and non-anaesthetists to achieve success rates of 90 to 95% may take longer, even after attending a three-hour workshop and performing 24 to 33 scans with expert feedback.[25] The positive and negative predictive values are both important attributes of a test. But when it comes to gastric ultrasound, the negative predictive value is the most important one, given the implications of a true "empty" stomach finding for aspiration prevention.[22]

In *Australasian Anaesthesia* 2023 Sidhu and Pozaroszczyk published a comprehensive summary of gastric ultrasound to eliminate guesswork in perioperative medicine and provide guidance for interested anaesthetists. It also challenges the question "Do you feel hungry?" that is commonly asked in the pre-anaesthetic room or before induction of anaesthesia. The question is very subjective since 86% of patients feel hungry again before the completion of gastric emptying, and 30% of them feel hungry after a meal.[26]

Like any risk assessment tool, gastric ultrasound in elective patients should take into consideration other risk factors that will delay gastric emptying and increase aspiration risk when assessing those patients. It is important for anaesthetists wishing to incorporate gastric ultrasound into their practice that they receive formal training (e.g. a workshop) then further supervised scans to obtain competence.[26]

"SIP TIL SEND"

What is the "Sip Til Send" approach?

"Sip Til Send" is a pragmatic approach to clear liquid fasting, with the aim to reduce patient discomfort and the harmful effects of prolonged deprivation of water and energy.

Two hours of fasting from clear liquids is widely demonstrated to be safe and used in all major fasting guidelines worldwide.[13,27,28] However, it has repeatedly been demonstrated that when a strict one- or two-hour clear liquids fasting guideline is in place, patients fast significantly longer.[9,10,29-32] A policy of allowing clear liquid consumption until called to theatre significantly reduces both the median fasting times and variability in fasting times without a demonstrated increase in regurgitation or pulmonary aspiration risk.[2,30,32,33] The "Sip Til Send" approach is more straightforward for both staff and patients and, when coupled with education and reassurance, is both straightforward and effective.[3]

There are various implementations of "Sip Til Send", but the common key features are as follows:

- Solids and non-clear liquids stop six hours before anticipated arrival at theatre.
- Clear liquids may continue up until the time the patient is sent for the procedure.
- Children may consume human breast milk up until three hours before surgery, and those under 12 months may consume formula or non-human milk up to four hours prior. Children over 12 months must withhold formula and non-human milk for six hours.[13]
- Medications can be taken when due with water.
- Emergency cases can follow "Sip Til Send" unless otherwise advised by a surgeon or anaesthetist.
- Fluid restrictions for medical reasons (e.g. renal or cardiac failure) should be maintained.
- Oral intake restrictions for surgical or medical reasons should be maintained.
- If there is confusion regarding a patient's individual circumstances, the co-ordinating or treating anaesthetist should be consulted.
- Patients excluded from "Sip Til Send" should still be encouraged to consume clear liquids up until two hours preoperatively (where safe to do so).

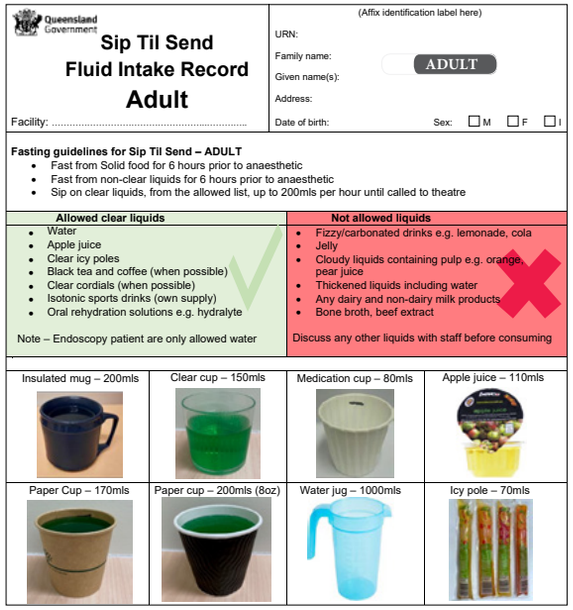
Variations in established protocols are mostly centred around the allowable amount of fluid intake; however, a safe maximum volume is not clearly defined.[2] Hospital-issue drinking cups are typically between 170 mL and 200 mL; therefore, most protocols specify an hourly volume allowed for adults. An amount of 3 mL/kg/hr is considered safe for children.[13,34]

As per traditional fasting recommendations, allowable liquids are those containing water and simple sugars. Liquids containing significant amounts of fat, protein, or fibrous material are excluded. This includes thickened fluids, and as such, patients requiring these due to pharyngeal dysfunction are excluded from "Sip Til Send". A small volume of milk in tea or coffee is typically allowed in the United Kingdom; indeed, this amount has not been shown to remain in the stomach longer than beverages without milk.[20,28] This practice is not common in Australian early adopters, given the lack of inclusion in our pre-existing guidelines.[13] Chewing gum and boiled candy must be removed before induction of anaesthesia due to the risk of inhalation. However, neither has been demonstrated to cause an increased risk of regurgitation or aspiration and consumption of these should not cause delay or cancellation of surgery.[13,28] Jelly is also not considered a clear liquid for "Sip Til Send" purposes; however, it has also been demonstrated to empty from the stomach like a liquid rather than a solid.[35] These equivocal items are often excluded from protocols mainly for the sake of simplicity (Table 1).

Table 1. Example of liquids allowed or not in "Sip Til Send" protocols

Allowable clear liquids	Not allowed
Water	Cloudy/pulpy juices
Clear juice without particulate matter	Thickened clear fluids
Cordial	Dairy/milk alternatives
Icy poles (if clear when liquid)	Bone broth/stock
Black tea or coffee	Protein drinks (even if clear)
Isotonic sports drinks	Carbonated beverages
Oral rehydration solutions	Jelly
Ice cubes	Lollies

Figure 5. "Sip Til Send" fluid intake record – Cairns Hospital


Queensland Government

Sip Til Send
Fluid Intake Record
Adult

Facility: .....

(Affix identification label here)

URN:

Family name:

ADULT

Given name(s):

Address:

Date of birth: Sex: ☐ M ☐ F ☐ I

Fasting guidelines for Sip Til Send – ADULT

- Fast from Solid food for 6 hours prior to anaesthetic
- Fast from non-clear liquids for 6 hours prior to anaesthetic
- Sip on clear liquids, from the allowed list, up to 200mls per hour until called to theatre

Allowed clear liquids

- Water
- Apple juice
- Clear icy poles
- Black tea and coffee (when possible)
- Clear cordials (when possible)
- Isotonic sports drinks (own supply)
- Oral rehydration solutions e.g. hydralyte

Note – Endoscopy patient are only allowed water

Not allowed liquids

- Fizzy/carbonated drinks e.g. lemonade, cola
- Jelly
- Cloudy liquids containing pulp e.g. orange, pear juice
- Thickened liquids including water
- Any dairy and non-dairy milk products
- Bone broth, beef extract

Discuss any other liquids with staff before consuming

Insulated mug – 200mls | Clear cup – 150mls | Medication cup – 80mls | Apple juice – 110mls

Paper Cup – 170mls | Paper cup – 200mls (8oz) | Water jug – 1000mls | Icy pole – 70mls

Most centres have abandoned patient exclusion criteria, due to the complexities in providing a list of specific contraindications. Furthermore, most conditions that impede gastric emptying slow the transit of solids significantly more than clear liquids.[2,21,36,37] A non-exhaustive list of conditions potentially impacting the safety of clear liquids consumption is included in Table 2, which should be evaluated in the individual patient with the same approach as the traditional assessment of fasting status. Pharyngeal dysfunction, achalasia, and gastro-oesophageal reflux do not alter gastric emptying of clear liquid and are thus not considered preclusions to the "Sip Til Send" approach.[2]

Table 2. Exclusion criteria for "Sip Til Send" and unclear considerations for inclusion

Exclusion criteria[10,11]	Considerations (unclear):
NBM for surgical reasons	Trauma[38] or GIT pathology[31]
NBM or thickened fluids for medical reasons (e.g. post stroke)	Pyloric stenosis[38] and other anatomical disorders[29]
Specific procedural fasting instructions (e.g. bowel preparation or radiographic studies)	Gastroparesis
If instructed by anaesthetist	GLP-1 receptor agonists
Patient refusal	Vagotomy[39]
	Prior bariatric or oesophageal surgery[13]
	High-dose opioids[13]
	Daily cannabis use[7]
	Severe Parkinson's disease[7]

NBM = nil by mouth, GIT = gastrointestinal, GLP-1 = glucagon-like peptide-1

The benefits of "Sip Til Send" and harms of extended liquid fasting

A 'Sip Til Send' approach benefits patients by reducing unnecessary dehydration and lack of carbohydrates caused by traditional fasting. With a two-hour clear fluid fasting rule, theatre schedules often lead to patients fasting longer than needed and delays due to "inadequate" fasting. Precise and consistent staff communication to provide constant updates about theatre timing must be enforced to achieve optimal fasting duration, although this is difficult to achieve in real-world practice.[9,33]

The concern regarding shortened fasting times is the potential for increased gastric volume and intraoperative regurgitation/aspiration. However, not only have these complications not been demonstrated by any of the early adopters, but the risk may even be reduced by ongoing consumption of carbohydrate-containing solutions.[3,10,29,31] Gastric pH is increased by the presence of dilute simple carbohydrate solutions, which increases gastric pH.[6] Solid fasting compliance may also be more likely with a more generous allowance of clear liquids.[29,40]

Patient and guardian experience is certainly improved with "Sip Til Send", with increased comfort and reduced hunger, anxiety, and fatigue.[2,3,10] In particular, it is undisputable that paediatric behaviour is improved with continued consumption of water and calories.[10,33,41] Nausea and vomiting are reduced both pre- and postoperatively, as are headaches from dehydration or caffeine withdrawal.[6,42-46] Postoperative delirium and related morbidity in the adult population also correlate with the duration of the liquid fast.[47] Finally, avoidance of dehydration may improve venous cannulation success.

Patient physiology and metabolism benefit from reduced water and sugar intake deprivation, particularly in the more vulnerable patients – small children and frail or medically complex patients.[48] Improved water intake reduces dehydration, hypovolaemia, hypotension, and renal impairment.[2,38,49] Perioperative blood sugar management is improved with reduced caloric deprivation, where prolonged fasting can contribute to decreased insulin sensitivity and subsequent elevated blood sugars postoperatively.[2,50,51] Ketosis and biochemical derangement are increased with prolonged fasting, as is the catabolism of muscle deleterious to patient strength and recovery.[41,51,52] Maintenance of preoperative oral intake may also promote early return of bowel function, which, alongside the reduction in postoperative nausea and vomiting, is beneficial to restoring early oral intake in accordance with "enhanced recovery after surgery" principles.[33]

It is logical that the benefits of a "Sip Til Send" approach and reduced fasting times for clear liquids may also improve health system resource utilisation and decrease expenditure. One would expect reduced antiemetic, intravenous (IV) fluids and vasopressor use, particularly in day-stay surgery.[10] The self-directed administration of liquids reduces staff workload by patients and the gains in efficiency resulting from this streamlined approach. There may also be improved theatre utilisation due to reduced delays when patients have fasted for fewer than two hours and decreased length of hospital stay resulting from postoperative complications.

Limitations of "Sip Til Send"

Thus far, it appears there are two primary limitations to the "Sip Til Send" approach to clear liquid fasting. The first is the potential for increased gastric volume, regurgitation, or aspiration in healthy and comorbid patients. The second is the institutional and cultural changes required to implement this strategy effectively.

As discussed, there has been no demonstrated increase in either regurgitation or aspiration in departments that have been early adopters of the "Sip Til Send" approach.[3,57] This is despite some centres reporting median liquid fasting times with "Sip Til Send" of less than two hours.[57] Events of regurgitation and aspiration are not correlated with clear liquid intake or timing but instead a variety of clinical factors, including inadequate anaesthesia, gastric hyperinflation, and emergency surgery.[7,31,32] Similarly, it appears that even when gastric transit is delayed, the residual fluid volume is not dissimilar when a two-hour versus "Sip Til Send" fast is deployed.[7,17,33] Although the issue still requires clarification, it appears that patients with potential delayed gastric emptying should be assessed and treated for aspiration risk using standard processes and may then, if deemed safe, participate in "Sip Til Send".

With regards to implementing a change to clear liquid fasting protocols, one can expect to encounter some resistance, as with any change to long-established practice. Bosse and colleagues discuss approaches to this, and local barriers should be identified and addressed where possible in the planning stages.[53] Reference to existing evidence-based care indicators and established practice in respected centres is essential, with widespread education and reassurance regarding the goals, benefits and safety before roll-out.[31] The process requires a multidisciplinary team with credible and committed leaders to champion the cause alongside an established route for stakeholders to direct concerns or questions.[54]

Implementation of "Sip Til Send" can be supported by easily accessible drink stations or beverages being handed out on patient admission, along with written instructions for patients and wall posters.[3,54] Examples of these are widely available from early-adopter health networks. The experience of patients and staff should be evaluated once these new fasting processes have been changed, and these results, alongside audit data regarding patient outcomes, should be used to further refine protocols. Demonstrating safe practice and improved patient and staff experience without increased complications will further improve buy-in and enthusiasm.

THE "SIP TIL SEND" INITIATIVE – SUCCESS STORIES

Early adopters

The recent surge of interest in "Sip Til Send" stemmed from work by the Scottish team led by MR Checketts in 2021 when they first coined the term and successfully introduced it in December of that year after months of planning and education.[3]

The "Sip Til Send" protocol adopted by Checketts allowed patients to sip one cup (170 mL) of clear liquid per hour until they were transported to theatre. The implementation successfully reduced median fluid fasting times from six hours to 17 minutes. To date, there has been no increase in reported adverse events through ongoing governance monitoring.[3] They subsequently supported many hospitals across the United Kingdom and internationally to launch their own programs.

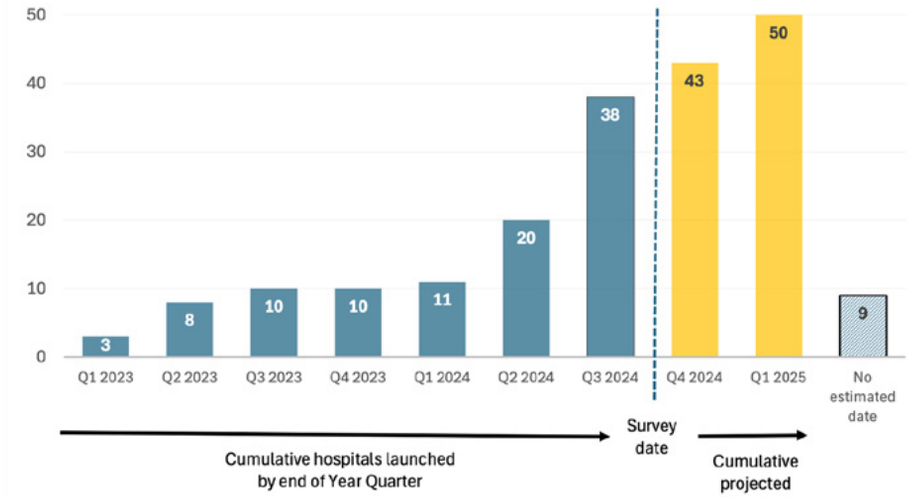
Growth of "Sip Til Send" in Australasia and formation of the Australasian Sip Til Send Network

The practice of allowing patients to drink until theatre to minimise fasting time is, in fact, not new. Some centres in Australia and abroad have been practising this for years.[55,56] "Sip Til Send" is simply a modern rebranding that came at the right time when anaesthesia practice was increasingly focused on improving perioperative care.

The Australasian Sip Til Send Network was established by one of the authors (PM) to promote "Sip Til Send" among the anaesthesia community and to form a local support base for hospitals wishing to adopt the program. One of the initial goals was to promote universal rules for "Sip Til Send" that can be applied to all hospitals, hoping to reduce the incidence of protocol breaches due to confusion arising from staff and patients moving between different hospitals. However, protocols must fit local needs, resulting in fine-tuning to accommodate each health service's idiosyncrasies. Some of the observed protocol variations stemmed from current controversies, such as how to manage preoperative fasting for patients on GLP-1 RA medications, with 31% of hospitals not allowing "Sip Til Send" for patients on these medications.[57]

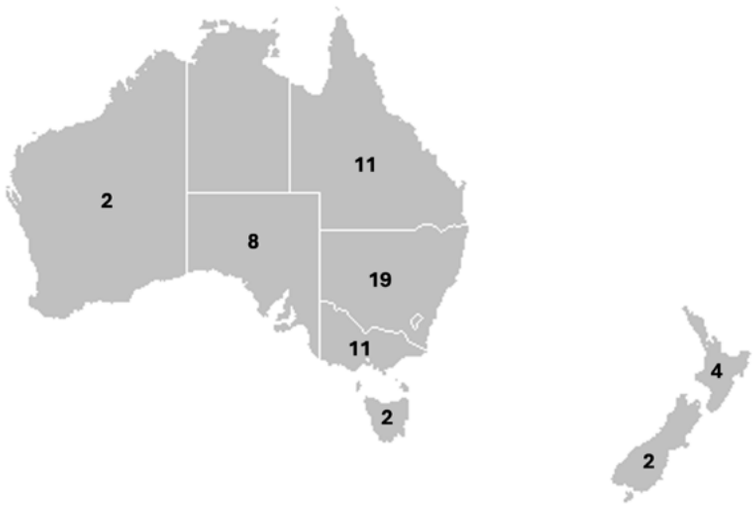
The collaboration of the Australasian Sip Til Send Network, the inclusion of "Sip Til Send" in ANZCA fasting guidelines, and a concurrent worldwide supply shortage of IV fluids, spurred the rapid growth of "Sip Til Send" in Australasia during 2023-2024. Data from an Australasian "Sip Til Send" implementation survey undertaken in late 2024 shows the rapid proliferation of "Sip Til Send" programs and their geographic distribution (Figures 6 and 7).[57]

Figure 6. Cumulative number of Australasian hospitals running "Sip Til Send"



Q = quarter; Y-axis is number of hospitals

Figure 7. Hospitals represented in Australasian "Sip Til Send" Implementation Survey, by region



"Sip Til Send" outcomes

In an unpublished audit of two weeks of theatre cases involving 619 patients after "Sip Til Send" was introduced, Cairns Hospital reported a median liquid fasting time of 1.8 hours. Of the 619 patients, 296 (48%) were booked for emergency surgery, and 52 (8%) were children. On subgroup analysis, median

liquid fasting times for emergency cases was 2.3 hours, for elective cases was 1.6 hours, for patients who participated in "Sip Til Send" (65% of all cases) was 1.5 hours, and for patients who did not participate in "Sip Til Send" was 2.9 hours. These were significant reductions from the hospital's audits prior to "Sip Til Send", where reported median times were 13 hours for adult inpatients, 5 hours for adult outpatients and 7.5 hours for outpatient children. Interestingly, with an active "Sip Til Send" program, even patients who did not participate in "Sip Til Send" had shorter fasting times compared to patients before the introduction of the program. As an example of the Hawthorne effect, it is thought that all patients may benefit when a hospital runs a "Sip Til Send" program, regardless of whether they participate.

Cairns Hospital has a QR-code-based system for reporting cases of regurgitation or suspected aspiration and frequently encourages staff to submit cases, which are later reviewed individually for diagnostic verification. It has reported no change in the incidence of aspiration in the periods before and after the introduction of "Sip Til Send" (Figure 8).

Figure 8. Aspiration and regurgitation audit from Cairns Hospital

	1st Feb to 14th July 2024		1st Aug to 31st Dec 2024	
	Pre-SipTilSend		SipTilSend	
	Regurg	Aspiration	Regurg	Aspiration
Frequency	33	7	23	7
Denominator	7368	7368	6829	6829
Risk	0.45%	0.10%	0.34%	0.10%
Probability	1 in 223	1 in 1053	1 : 297	1 : 976

Regurg = regurgitation

An Australasian "Sip Til Send" survey found that hospitals reported a reduction in liquid fasting times and no increase in aspiration rates.[57]

Role of multicentre studies

While single-centre audits have, to date, not reported a change in aspiration incidence, these are all underpowered. Adequately powered studies to compare such an event as rare as pulmonary aspiration require very large numbers of patients. Addressing this challenge, the Australasian Sip Til Send Network is conducting the Australasian Multicentre Aspiration Risk Study (MARS), a multicentre observational study assessing the risk of aspiration in hospitals practising "Sip Til Send", compared to those with more restrictive fasting programs.

CONCLUSION

"Sip Til Send" represents a potentially transformative approach in perioperative care that allows patients to safely consume approved clear liquids up until they are called to the operating theatre, thereby shortening their fasting period. This reduction in fasting time is associated with several benefits, such as more effective gastric emptying, decreased gastric residual volume, minimised physiological stress during anaesthesia, lower rates of postoperative nausea and vomiting (PONV), and enhanced patient comfort and satisfaction.

"Sip Til Send" may have the potential to have significant economic benefits due to its flexibility in adapting to changes in theatre scheduling and improving theatre utilisation times. It may be particularly valuable in reducing extended fasting periods for inpatients awaiting emergency surgery, where frequent delays due to theatre unavailability are common. Future studies may look at other benefits associated with "Sip Til Send", such as reducing the need for IV fluid therapy, hospital length of stay, and postoperative complications.

Until now, audited data from early adopters of "Sip Til Send" have not demonstrated significant evidence of increased aspiration risk compared to more conservative fasting guidelines, making "Sip Til Send" a promising and reassuring practice change to liquid fasting.

It's SIMPLE, it's SAFE, it's KIND.

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